Description

WORK MACHINE ARRANGEMENT

Technical Field

[01] This invention relates to a work machine arrangement and more particularly to a work machine arrangement in which the work machine has a rear-mounted radiator oriented substantially parallel to a longitudinal axis of a work machine arm.

Background

[02] Typically, work machines of the type often referred to as boom trucks or telehandlers use an attachment mounted to a telescopic arm to raise loads to, or lower loads from, an elevated position. The extension of the arm, or its reach, is typically limited by such physical parameters as the machine's body size, weight, and engine placement. Consequently, if the end user desires to obtain a machine with a needed reach, the operator must obtain a machine having those physical parameters corresponding to the needed reach requirement. However, it may oftentimes be the case in which the size and weight of the machine needs to be minimized while requiring a reach range exceeding the machines physical parameters. This situation may arise, for example, if the work machine is typically transported to a work site by another machine such as a highway truck, airplane or train.

Prior art attempts to solve the aforementioned problems can be found in U.S. Patent No. 3,985,248, issued on Oct. 12, 1976 to Reinald D. Liegel et al., and U.S. Patent No. 6,024,232, issued on Feb. 15, 2000 to Kenneth Helgesson. Both teach boom trucks in which the arm is pivotally coupled to the boom truck body at a horizontal location substantially above the cab. Although

both designs may be adequate for their respective intended purposes, both designs may be problematic for those applications in which the vehicle height is a concern.

[03] The present invention is directed to overcoming one or more of the problems as set forth above.

Summary of the Invention

[04] According to an aspect of the present invention, a work machine arrangement for a work machine is provided. The work machine has a work machine body and an extensible arm, connected to the work machine body, having an arm longitudinal axis. An engine cooling apparatus is mounted to the work machine body. The engine cooling apparatus has a engine cooling apparatus longitudinal axis oriented substantially parallel to the arm longitudinal axis.

Brief Description of the Drawings

[05] Fig. 1 is a diagrammatic elevation view of a work machine that embodies the principles of the present invention.

[06] Fig. 2 is a diagrammatic top plan view of a rear portion of the work machine of Fig. 1.

[07] Fig. 3 is a diagrammatic elevation view of the rear portion of the work machine of Fig. 1 illustrating two orientations of the arm.

Detailed Description

[08] Referring to the drawings, an exemplary work machine of the type typically termed a telehandler or boom truck is shown generally at 100 and comprises a body 101 having a front portion 104, a rear portion 105, and a body longitudinal centerline denoted 108 extending between the front and rear portions 104,105. The body 101 includes a cab portion 109 which is preferably oriented to either side of the body longitudinal centerline 108 (as shown best in

Fig. 2). An engine 112 is mounted adjacent the rear portion 105 and provides the motive force used to drive a set of wheels 113 coupled to the work machine 100. Also shown is a cooling apparatus, preferably a radiator 116, operatively coupled to the engine 112, for thermally regulating the engine's temperature.

[09] An arm 117 is coupled to the body 101 adjacent to the rear portion 105 of the work machine 100 and includes an arm longitudinal axis 118. The arm 117 preferably comprises an extensible arm, and more preferably a telescopic arm having a substantially hollow base portion 120 sized to receive a telescoping portion 121 which is extendable and retractable, relative to the base portion 120, by conventional means such as, for example, hydraulic pressure. The telescoping portion 121 includes a distal end 124 which is adapted to receive an assortment of attachments including a fork 125, as shown. Alternatively, the arm 117 may include multiple sequentially extendable and retractable concentric telescoping sections. The arm 117 is preferably pivotally coupled to the body 101 about a pivot pin 128 and is operable via a hydraulic cylinder (not shown) to pivot the arm 117, relative to the body 101, in the direction of arrows 130 and 131. For reasons which should become apparent as this disclosure progresses, the pivotal connection at the pivot pin 128 is preferably located so as to provide the arm with an elongated arm tail portion 134 extending from the pivot pin 128 towards the rear portion 105 of the work machine 100.

[10] With reference to Fig. 2, shown is the rear portion 105 of the work machine 100 with a portion of the body 101 removed for clarity. As shown, the exemplary radiator 116 described herein is preferably substantially rectangular in cross section having a radiator longitudinal axis denoted 201. The radiator 116 is mounted to the rear portion 105 such that the radiator longitudinal axis 201 is substantially parallel to the arm longitudinal axis 118. As should be appreciated, by orienting the radiator 116 in the aforementioned manner, a longer arm tail portion 134 may be provided which allows the arm 117 to have a greater reach without any substantial modifications to either the body 101 or location of the pin

128. In particular, for those work machines 100 of the type described herein in which the arm 117 is preferably mounted on one side (denoted herein as 202) of the body longitudinal centerline 108, the placement of the radiator longitudinal axis 201 on the other side (denoted herein as 202') of the body longitudinal centerline 108 minimizes substantial modifications of the body 101 to accommodate the preferred orientation of the radiator 116.

[11] Shown in Fig. 3 is an elevational view of the rear portion 105 of the work machine 100 with the arm 117 positioned in different stages of articulation about pin 128. As shown, clockwise articulation of the arm 117 about pin 128 causes the arm tail portion 134 to sweep in an arc denoted 300. As should be apparent to those of ordinary skill in such art, any interference between the extended arm tail section 134 and the radiator 116 which would otherwise occur but for the placement of the radiator 116 in the aforementioned manner is eliminated.

Industrial Applicability

[12] In the operation of the work machine 100 shown in Fig. 1, articulation of the arm 117 about pin 128 elevates the fork 125 to the desired vertical coordinate, whereas extension or retraction of the telescoping portion 121 places the fork 125 at the desired horizontal coordinate from the work machine 100. For those work machines 100 having rear mounted radiators 116, the maximum reach of the arm 117 is typically limited by the physical constraints imposed upon the vehicles such as, for example, the specified size and weight constraints of the work machine 100 as well as the placement of the radiator 116.

[13] Orientating the radiator 116 such that the radiator's longitudinal axis 201 is substantially parallel with the arm longitudinal axis 118, as shown best in Fig. 2, allows for an extended arm tail portion 134. This, in turn, provides the work machine 100 with an increased reach while maintaining substantially the same body size, weight, and pin 128 location. As should also be appreciated by those of ordinary skill in such art, by orienting the radiator 116 in the

aforementioned manner, the size of the radiator 116 need no longer be constrained by the transverse size limitation of the rear portion, thereby allowing the radiator 116 to have an increased longitudinal length.

[14] Other aspects, objects and advantages of this invention can be obtained from a study of the drawings, the disclosure and the appended claims.